

Remarks

With respect to the present application, claim 1 has been amended, claim 2 has been canceled, and claims 22-24 have been added. The claims as amended and added herein are fully supported by the specification and claims as filed, and thus no issue of new matter arises by virtue of their amendment. The claims as amended and added better encompass the full scope and breadth of the invention notwithstanding the Applicants' belief that the claims would have been allowable as originally filed.

Applicants submit that the claims are in a condition for allowance, and respectfully request a notice to that effect. If the Examiner believes that discussion or claim amendments of a minor nature would advance the prosecution of the application, he/she is highly encouraged to telephone the Applicants' attorney at the number given below.

Respectfully submitted,
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Attachment

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Claims

1. (Amended) A process for forming a lubricative film for cold working on a metal substrate, said process comprising the following operations:

(I) bringing said metal substrate into contact with an aqueous electrolyte solution comprising water and;

- (A) dissolved zinc cations;
- (B) dissolved phosphate anions; and
- (C) at least one dissolved auxiliary acid other than phosphoric acid, said auxiliary acid having at least a first ionization constant that is greater than the third ionization constant for phosphoric acid; and, optionally, other constituents as detailed further below,

this aqueous electrolyte also being in contact with a counter-electrode that is not said metal substrate to be cold worked, so that an electric current can pass through the counter-electrode as anode, the aqueous electrolyte solution by ionic conduction, and said metal substrate as cathode;

(II) passing through said metal substrate while it remains in contact with said aqueous electrolyte solution an electric current that has a net cathodizing character at said metal substrate for a sufficient time to form an adherent solid phosphate conversion coating over said metal substrate;

(III) discontinuing contact between said aqueous electrolyte solution and said metal substrate bearing said adherent solid phosphate conversion coating; and

(IV) applying to the exterior surface of said solid phosphate conversion coating, when it is not in contact with said aqueous electrolyte solution, a water- or oil-based lubricant coating,

wherein said aqueous electrolyte solution in operation (I):

comprises at least 20 g/l of dissolved zinc cations and at least 20 g/l of dissolved phosphate anions; and

has a pH value at least as low as the pH value of a hypothetical reference electrolyte solution that contains the same actual amounts of dissolved zinc and phosphate ions as does said aqueous electrolyte solution and in addition contains at least 30 g/l of nitric acid as its only auxiliary acid.